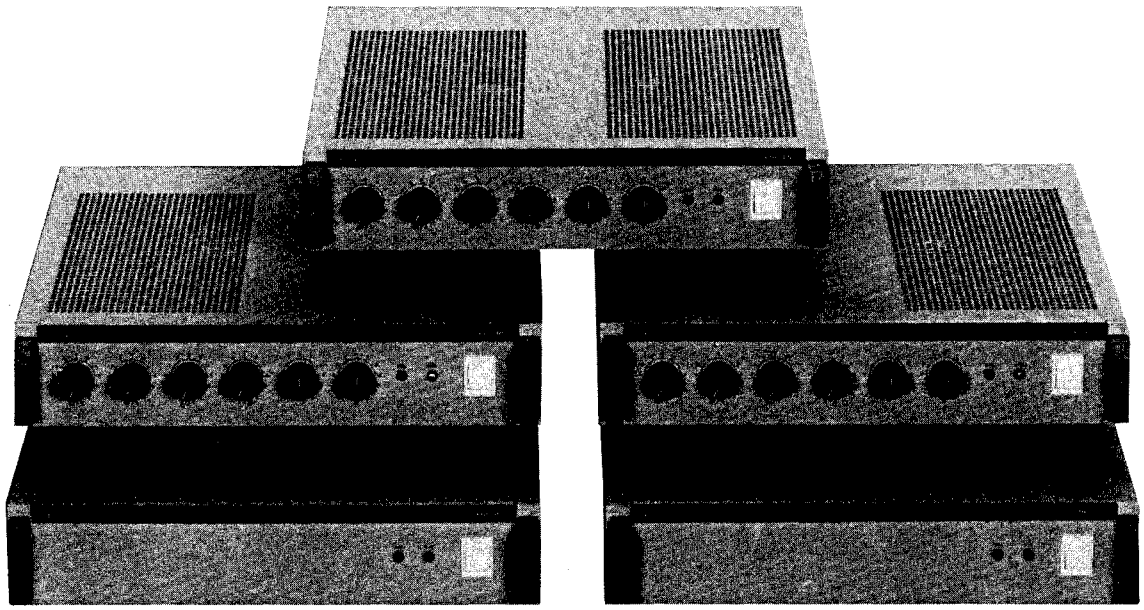
Service Manual

Mixing Amplifiers LBB 1221/40 - 30 W
LBB 1222/40 - 60 W
LBB 1223/40 - 120 W

Power Amplifiers LBB 1224/00 - 60 W
LBB 1225/00 - 120 W



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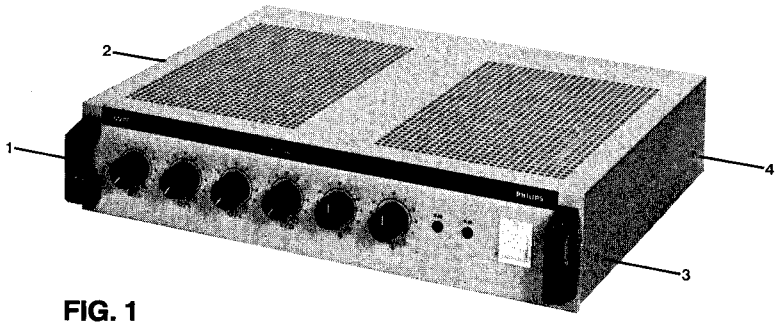
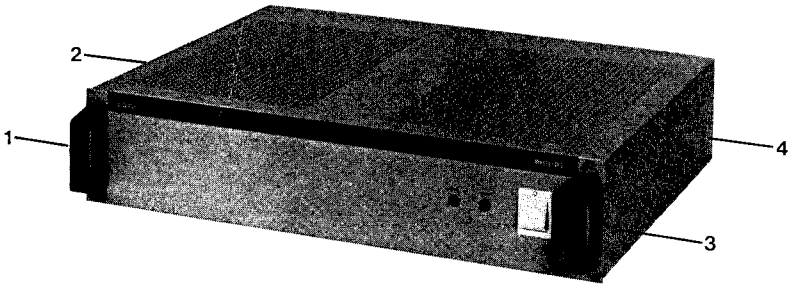


FIG. 1



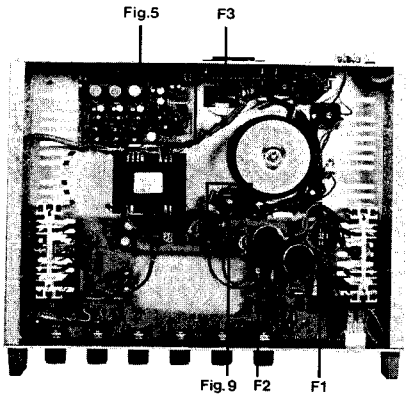
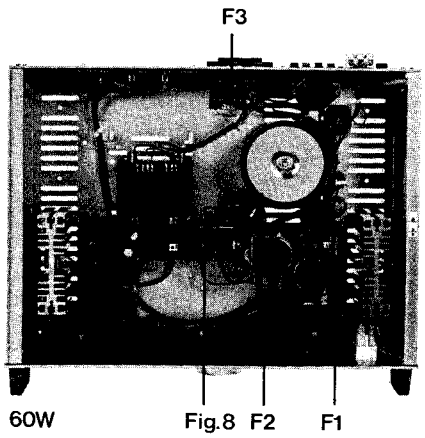
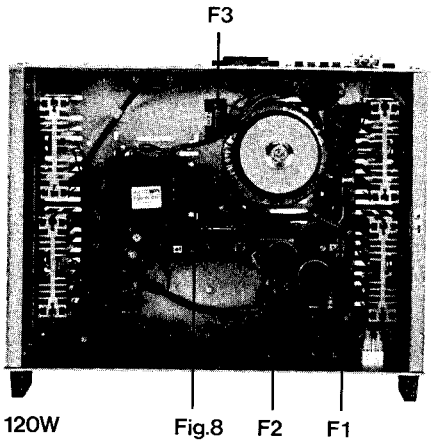


FIG. 2





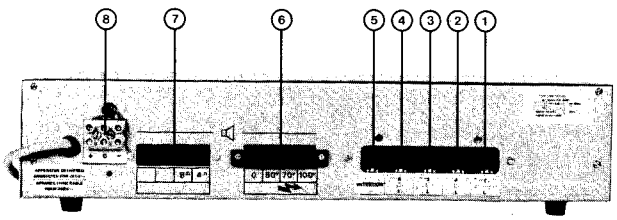


FIG. 3

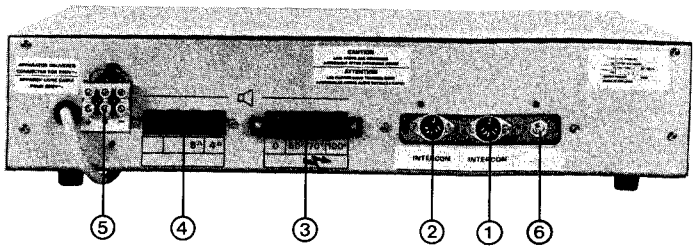


FIG. 10

MIXING/POWER AMPLIFIERS

CONTENTS

1. GENERAL

2. BLOCK DIAGRAM

3. TECHNICAL DATA

4. INSTALLATION AND OPERATION

5. CIRCUIT DESCRIPTION

6. REPAIRS AND MEASUREMENTS

7. PARTS LIST

8. CIRCUIT DIAGRAM AND LAY OUT PRINT BOARD

SERVICE MANUAL

Mixing amplifiers

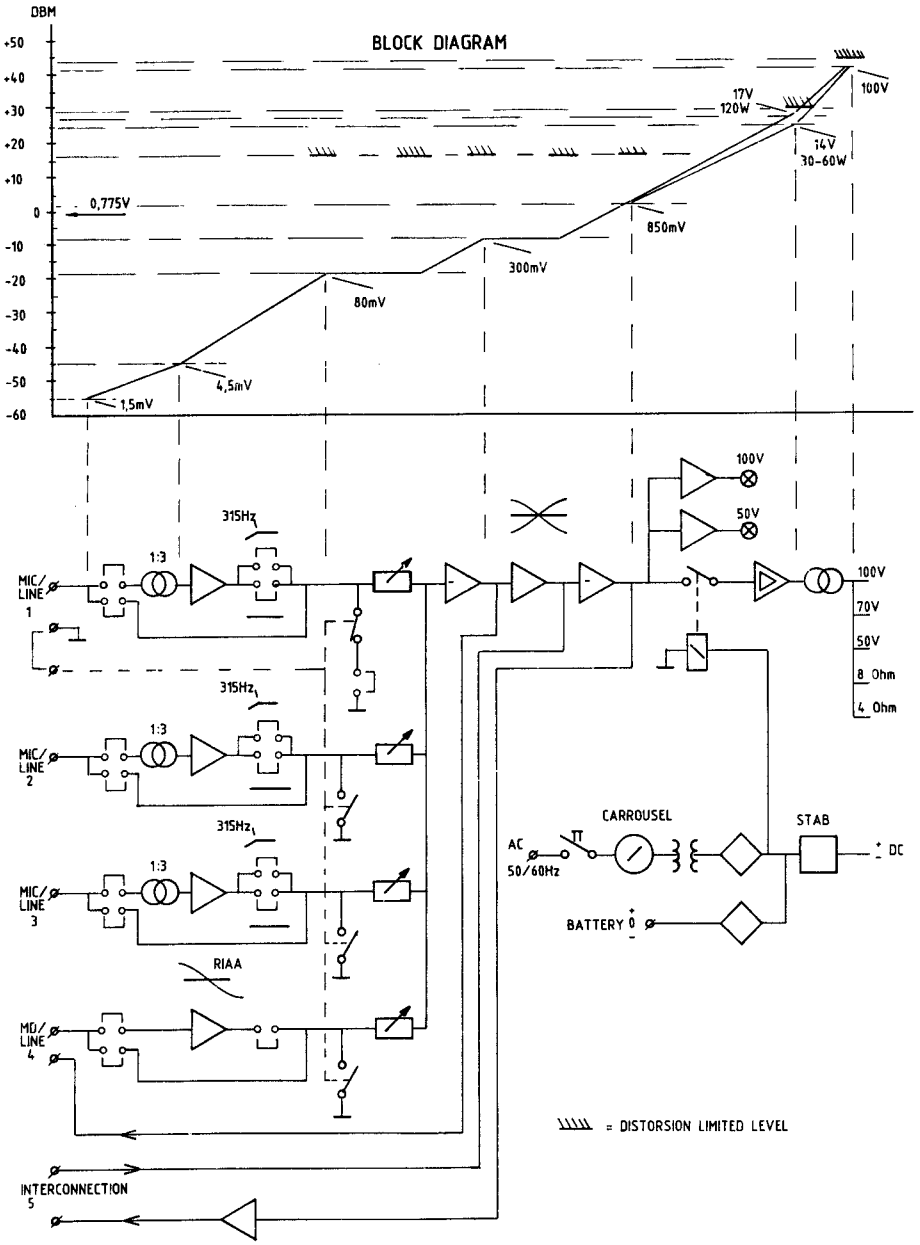
LBB 1221/40 - 30 W
LBB 1222/40 - 60 W
LBB 1223/40 - 120 W

Power amplifiers

LBB 1224/00 - 60 W
LBB 1225/00 - 120 W

1. GENERAL

The amplifiers are mono mixer and booster AC/DC amplifiers. They can be operated on 110, 127, 220 or 240 V, 50-60 Hz, AC supply or on DC supply as stand-by power.



2. BLOCK DIAGRAM

This product is manufactured to comply with the radio interference requirements of the Council Directive of 4 November 1976 76/889/EEC; 76/890/EEC resp.

3. TECHNICAL DATA

Mains supply : 110, 127, 220 and 240 V ± 10%, 50/60 Hz

Battery supply
30 W version : +24 V, 0 V, -24 V ± 10%
120/60 W version : +34 V, 0 V, -34 V ± 10%

Rated output power	Mains	Battery
LBB 1221/40	30 W	23 W
LBB 1222/40	60 W	50 W
LBB 1223/40	120 W	120 W
LBB 1224/00	60 W	60 W
LBB 1225/00	120 W	120 W

Input channels mixers: four input channels, one with priority possibility, three with microphone/music/speech filter and phantom power supply and one Magneto-dynamic pick-up channel.

Channel 1 (priority) +
Channels 2, 3 and 4 : Attenuation 40 dB

	Microphone	Music	Pick-up	RIAA karakt.
Input impedance :	3 kOhm	47 kOhm	30 kOhm	60 Hz +12 dB ± 15
Input sensitivity :	1.5 mV	150 mV	2.5 mV	10 kHz -12 dB

	Pre-amp. output	Power amp. input
Intercon. socket :		
Impedance :	25 Ohm	10 kOhm
Sensitivity :	± 750 mV	± 500 mV

Frequency response : 60 to 18.000 Hz (+1 dB / -3 dB) also for boosters

Treble boost/cut : +10 dB / -10 dB (at 10 kHz)

Bass boost/cut : +10 dB / -10 dB (at 100 Hz)

Speech filter cut-off: -3 dB at 315 Hz

Input channels boosters : Two interconnection sockets

Input impedance : 10 kOhm

Input sensitivity : 500 mV ± 3 dB

Noise level : load of input 2 kOhm volume control maximum output -70 dBm

Noise levels load of inputs : microphone 200 Ohm pick-up 47 kOhm/Line 47 kOhm

All channel potentiometers countre clockwise : 72 dB

1 microphone input clockwise : 65 dB with respect to the rated output power

1 line input clockwise : 70 dB

1 MD input clockwise : 55 dB

Loudspeaker outputs Output voltages	LBB 1221/40	1222/40	1223/40	1224/00	1225/00
100 V output :	100 V	100 V	100 V	100 V	100 V
70 V output :	70 V	70 V	70 V	70 V	70 V
50 V output :	50 V	50 V	50 V	50 V	50 V
8 Ohm output :	15 V	22 V	31 V	22 V	31 V
4 Ohm output :	11 V	15 V	22 V	15 V	22 V
Minimum load impedances					
100 V output :	330 Ohm	165 Ohm	82 Ohm	165 Ohm	82 Ohm
70 V output :	165 Ohm	82 Ohm	41 Ohm	82 Ohm	41 Ohm
50 V output :	82 Ohm	41 Ohm	20 Ohm	41 Ohm	20 Ohm
8 Ohm output :	8 Ohm	8 Ohm	8 Ohm	8 Ohm	8 Ohm
4 Ohm output :	4 Ohm	4 Ohm	4 Ohm	4 Ohm	4 Ohm
Current consumption at rated power :	430 mA	760 mA	1.2 A	760 mA	1.2 A

Distortion : 1% at nominal power

Quiescent current pre-amplifier : 40 mA ± 20%

Safety : according to IEC65
A + B deviations CENELEC, Semko, Nemko, Demko and BSI415 standards

Environmental conditions
Operation temperature: -10°C to 35°C
Storage temperature : -40°C to 70°C
Relative humidity : = or 95%

Dimensions :	420 x 335 x 100 mm				
Weight approx. :	7 kg	8 kg	9 kg	7 kg	9 kg

4. INSTALLATION AND OPERATION

4.1 MAINS CONNECTIONS AND EARTHING

These audio amplifiers are supplied ready for use on 220 V mains. They are adjustable for use on 110 V, 127 V and 240 V by changing the setting of a four position rotary switch which is mounted inside the amplifier.

The amplifiers are fitted with a 1.8 m long mains cord terminated with a 2 pole mains plug with earth contacts. In some countries it will be necessary to replace the mains plug with one of a local standard type. A replacement plug must be wired as follows:

Earth - green/yellow
Neutral - blue
Live - brown

WARNING
THIS AMPLIFIER MUST BE EARTHED VIA THE MAINS CORD.

4.2 OPENING THE AMPLIFIER see fig. 1

Access may be gained to the voltage selector, the mains fuse, the d.c. supply fuses and internally mounted components, by removing the four cross-headed screws, two on each side of the amplifier and removing the top cover. Care should be taken not to lose the toothed shake-proof washer which is fitted under the head of the rear right-hand screw. This washer is required to electrically bond the top cover to the earthed chassis of the amplifier. For safety reasons, this washer must always be fitted when the amplifier is in use.

NOTE:
Before removing the cover, disconnect the amplifier from the mains supply. For safety reasons, it is not sufficient just to switch the amplifier off.

4.3 FUSES see fig. 2

F1 - d.c. fuse mounted on the printed circuit board
F2 - d.c. fuse mounted on the printed circuit board
F3 - mains fuse mounted internally on the chassis
KLIXON - self restoring thermal cut-out mounted in the mains transformer

	F1	F2	F3 110/127 V	F3 220/240 V
LBB 1221/40	T2.5A	T2.5A	T3.15A	T1.6A
LBB 1222/40	T4.0A	T4.0A	T3.15A	T1.6A
LBB 1223/40	T6.3A	T6.3A	T4.0A	T1.6A
LBB 1224/00	T4.0A	T4.0A	T3.15A	T1.6A
LBB 1225/00	T6.3A	T6.3A	T4.0A	T2.5A

WARNING
THE TERMAL CUT-OUT OPERATES ON THE PRIMARY WINDING OF THE MAINS TRANSFORMER AND ALTHOUGH ALL INDICATOR LAMPS MAY BE OFF, THE FULL MAINS SUPPLY VOLTAGE IS STILL PRESENT INSIDE THE AMPLIFIER. IF THE AMPLIFIER NEEDS TO BE OPENED UNDER SUCH CONDITIONS, FIRST DISCONNECT THE AMPLIFIER FROM THE MAINS SUPPLY.

4.4 BATTERY SUPPLY

The 30, 60, 120 W amplifiers may be operated with an external battery supply of ± 24 V, ± 34 V, with the 0 V supply line earthed. A protection circuit is incorporated to prevent any damage to the amplifier which may otherwise be caused by inadvertent reversal of the battery supply polarity.

NOTE:
Even when operated from external batteries, it is still advised, because of the presence of high voltages, to earth the amplifier. Electrical stability of the system is also maintained if the amplifier is earthed.

4.5 COOLING

To ensure adequate ventilation of the unit, the ventilation slots in both the amplifier's top and bottom covers must be kept clear at all times. A thermal cut-out in the mains transformer switches of the amplifier if the temperature of the mains transformer becomes too high. After the transformer has cooled down sufficiently, the amplifier will be switched back on again automatically.

4.6 CONNECTIONS MIXERS see fig. 3 and 8

1	Input channel 1	: Line/Microphone input + priority (Symmetrical input with phantom power supply)
2	Input channel 2	: Line/Microphone input (Symmetrical input with phantom power supply)
3	Input channel 3	: Line/Microphone input (Symmetrical input with phantom power supply)
4	Input channel 4	: Line/Pick-up input (RIAA filter)
5	INTERCON.	: Interconnection point Preamplifier output + power amplifier input
6	Loudspeaker output	: 100 V, 70 V and 50 V transformer output
7	Loudspeaker output	: Low impedance transformer output 4 ohm and 8 ohm.

8	Battery supply input	: +24 V, 0, -24 V or +34 V, 0, -34 V.

Inputs

1	Microphone input (priority)	: 5-pole 180° DIN socket
	Pole 1	: signal core (+ phantom supply)
	Pole 2	: electrical earth screen (- phantom supply)
	Pole 3	: signal core (+ phantom supply)
	Pole 4	: remote control priority switch (earth connection, linked to pole 2)
	Pole 5	: remote control priority switch (When poles 4 and 5 are joined together, all other inputs are switched off).
2 and 3	Microphone inputs	: 5-pole 180° DIN socket
	Pole 1	: signal core (+ phantom supply)
	Pole 2	: electrical earth screen (- phantom supply)
	Pole 3	: signal core (+ phantom supply)
	Poles 4 and 5	: not connected
4	Pick-up/line input (tape recorder output)	: 5-pole 180° DIN socket
	Poles 1 and 4	: signal core ore tape recorder output
	Pole 2	: electrical earth screen
	Pole 3	: signal core
	Pole 5	: not connected
5	Input/Output	: 5-pole 180° DIN socket
	Pole 1	: not connected
	Pole 2	: electrical earth screen
	Pole 3	: signal core (Power amplifier input post tone control)
	Pole 4	: not connected
	Pole 5	: signal core (Pre-amplifier output)

Outputs

6	Loudspeaker output 0, 50 V, 70 V, 100 V	: 4-pole terminal block
7	Loudspeaker output 4 ohm and 8 ohm	: 4-pole terminal block

Controls (see fig. 4)

1	Volume control	- Input channel 1
2	Volume control	- Input channel 2
3	Volume control	- Input channel 3

4 Volume control - Input channel 4
5 Bass tone control - Input channels 1 to 4
6 Treble tone control - Input channels 1 to 4
7 Mains on/off switch
8 Output level indicator lamps (6 dB and 0 dB)

NOTE:
The output level is at -6 dB when the indicator lamp marked 6 dB is on.

Connections (Boosters see fig. 8 and 10)

1 INTERCON. : Interconnection point amplifier input

2 INTERCON. : Interconnection point amplifier input

3 Loudspeaker output : 100 V, 70 V and 50 V transformer output

4 Loudspeaker output : Low impedance transformer output

5 Battery supply input : 60 W version: +34 V, 0 V, -34 V
: 120 W version: +34 V, 0 V, -34 V

Inputs/Outputs

1/2 INTERCON. : 5-pole 180° DIN socket

Pole 1 : not connected
Pole 2 : electrical earth screen
Pole 3 : not connected
Pole 4 : not connected
Pole 5 : signal core - amplifier input or output to the following amplifier input - linked to pole 5 on the other socket

6 Input sensitivity control for both inputs

Outputs

3 Loudspeaker output : 4-pole terminal block
0, 50 V, 70 V, 100 V

4 Loudspeaker output : 4-pole terminal block
4 ohm and 8 ohm

Controls (see fig. 11)

1 Mains on/off switch

2 Output level indicators LED - 6 dB and 0 dB

Jumper settings for Inputs 1 to 4 inclusive (see fig. 5)

Input	Required function	Jumpers fitted	Jumpers removed
1	Microphone input	S1A + S5A + S5B	-
	Microphone input + speech filter	S1A + S5B	S5A
	Line input	S1B	S5B
	Muted if priority not activated	S9	-
2	Microphone input	S2A + S6A + S6B	-
	Microphone input + speech filter	S2A + S6B	S6A
	Line input	S2B	S6B
3	Microphone input	S3A + S7A + S7B	-
	Microphone input + speech filter	S3A + S7B	S7A
	Line input	S3B	S7B
4	Pick-up input	S4A + S8	-
	Line input	S4B	S8

On delivery the jumper settings are as follows:

S1A, S2A, S3A and S4A fitted.
S8 and S9 fitted.
S5A, S6A and S7A fitted.
S5B, S6B and S7B fitted.

Inputs 1, 2 and 3 are suitable for announcement microphones (speech filter in) and input 4 for music (pick-up with RIAA filter).

4.7 CONNECTING LOW IMPEDANCE LOUDSPEAKERS (see fig. 6)

Low impedance loudspeakers should be connected to the 4 ohm or the 8 ohm output so that the sum of their impedances is equal to or greater than, the respective impedance of the output in use. Impedance matching can be achieved by arranging the loudspeakers in series or parallel or series/parallel configurations. In order to avoid damaging loudspeakers, the power handling capacity of the loudspeakers intended for use must be considered.

4.8 LOUDSPEAKERS FOR 100, 70 or 50 V SYSTEMS see fig. 7

Loudspeakers with suitable matching transformers can be connected in parallel to the 100, 70 or 50 V output so that the total nominal loudspeaker load does not exceed the nominal output power rating of the amplifier. 100 V loudspeakers connected to the 100 V output will consume their nominal power. If, however, 100 V loudspeakers are connected to the 70 V output, then the loudspeakers' power consumption will be equal to one half of their nominal rated power. This means that twice as many loudspeakers (all having the same nominal power rating) can be connected without overloading the amplifier.

Similarly, if 100 V loudspeakers are connected to the 50 V output they will consume only a quarter of their nominal power and up to four times as many loudspeakers is possible.

4.9 IN-PHASE CONNECTION OF LOUDSPEAKERS

Disturbing effects can occur, particularly when loudspeakers are mounted close together, which are caused by the loudspeakers being connected in anti-phase. To ensure an in-phase connection in 100 V systems, all similarly marked loudspeaker terminals (in most cases one terminal is marked with a red dot) must be connected to the same wire on the distribution cable. In low impedance installations series/parallel arrangements must be made as illustrated in figure 6.

4.10 Parallel connection of amplifier inputs

The pre-amplifier output of this amplifier may be connected to the power amplifier input of an other mixing amplifier or the input of a power amplifier by means of the INTERCON socket on the rear panel.

4.11 Earthing amplifier combinations

When more than one amplifier is used in a system, it is necessary to ensure that earth loops and the associated problem of hum on the output signal are not introduced by the earth wiring.
The electrical earth and the mechanical earth on all but one amplifier should be separated by removing the marked wire link x see fig. 9.

5. DESCRIPTION (see circuit diagram)

The pre-amplifier consists of 3 microphone pre-amplifiers and one turntable pre-amplifier. The microphone pre-amplifiers are provided with input transformers and phantom power supply. The turntable amplifier has an asymmetrical input with an RIAA circuit for the connection of an M.D. pick-up element. The four circuits are provided with 2 dc coupled transistors. The first circuit has a priority function when activating this circuit, tS213 is non conducting. The voltage on the collector of TS213 will be increased up to +6.2 V and TS210, TS211 and TS212 couple the output signal to earth. When TS209 is connected to TS213 via jumper S9E, TS209 will also conduct the output signal to earth. The four line inputs are directly connected to the four rotary level potentiometers. A fifth circuit is present on the pre-amplifier PCB to provide a protection against short circuiting on the DIN connector. Via IC2a a tone control circuit is provided with R37 for the low frequencies and R38 for the high frequencies. Via mixing amplifier IC3a a protection circuit is provided to avoid clicks in the loudspeakers during on/off of the mains switch S1. The activation of RE401 with transistor TS401 happens via diode D22 for 220 Vac and diodes D20, D21 for 2 times 24 Vdc.

The booster part consists of a different amplifier TS11 and TS12. Potentiometer R60 attents to zero volt on the primary of the output transformer. TS14 is thermally connected with the output stage and protected agains too much variation of the quiescent current. When the amplifier is switched on, R77 can be adjusted for the final quiescent current. The output stage has a dynamic voltage, current protection circuit built up with transistors TS17 and TS18. Two security circuits are provided

1. indicates 6 dB below the max. output level of 100 V by comparator IC4b and LED D7.
2. indicates max. output level of 100 V by comparator IC4a and LED D6.

6. MEASUREMENTS

6.1 REPAIRING METHODS

When the amplifier does not work, we suggest that the following checks are made:

1. Check fuses
   If they are blown disconnect first wires of the + and - dc supply of the power transistors P17 and P18.

2. Measure with an Ohmmeter between the emittor and collector of the power transistors, the driver transistors TS17 and TS18 and the diodes D4 and D14. Most of the time they are short circuit.

3. Fit new fuses and switch on the amplifier. First measure the + and - dc supply on the fuses. Measuring also the + and - dc supply on the operation amplifiers (OP, AMP). After that measure on the output of the OP AMP. Under good condition it must be approx. 0 V. Under bad conditions it is a + or + dc voltage. In that case renew the OP AMP.

4. After repairing the power transistors, don't forget the grease, increase slowely the mains supply by using a variac. Observe the current consumption. This should be less than 0.5 Amp. When the mains supply is at full voltage adjust first the quiescent current and load the amplifier before you send a signal through the amplifier.

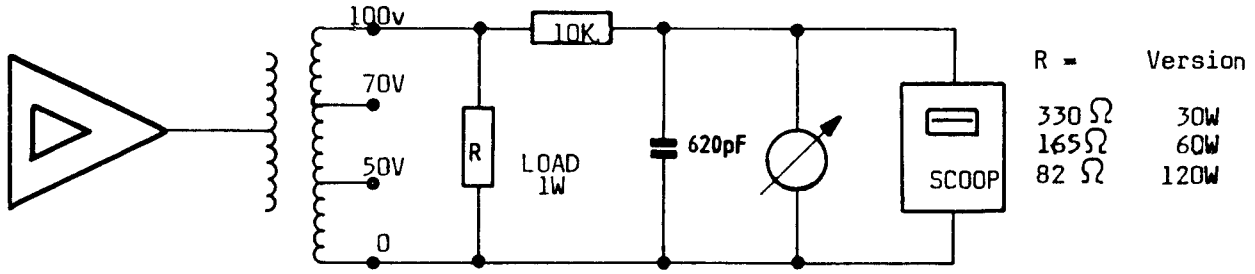
6.2 SIGNAL-TO-NOISE

To measure the S/N ratio use in front of the measuring equipment a fixed tap to be sure that no high frequency interference disturbs the final results. Load resistance approx. 300 ohm for the 30 W amplifier, 160 ohm for the 60 W amplifier and 80 ohm for the 120 W amplifier.

Switch on the amplifier and warm up for about 15 minutes. Adjust with R60 a minimum dc voltage on the primary winding of the output transformer P27 and P4.

NOTE:
Premagnetization of transformers give distortion.

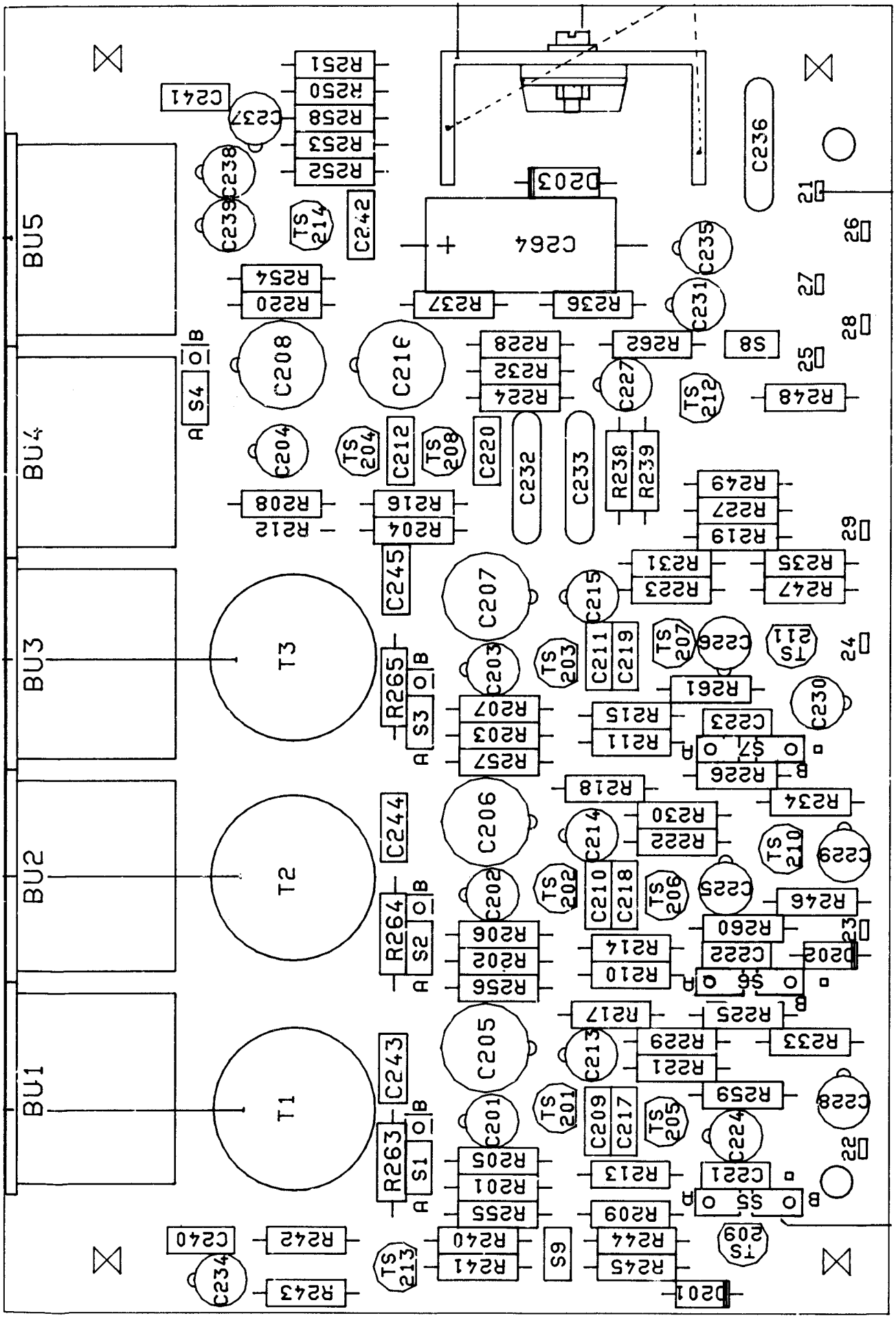
For the quiescent current adjust with R77 without input signal 25 mA or approx. 25 mVdc on points P5 of TS19 and P6 of TS20. With signal of about 10 V on the 100 V output tap, the distortion must be below 1% between 100 Hz - 14 kHz.

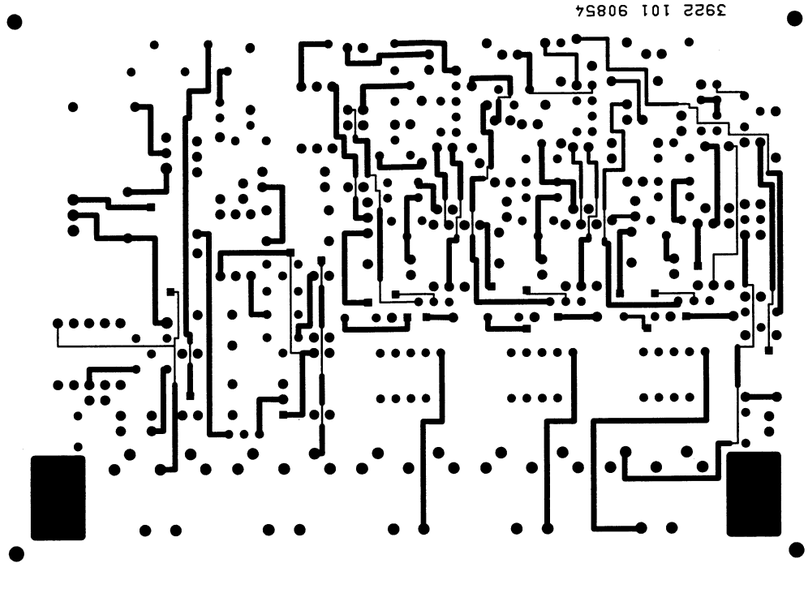


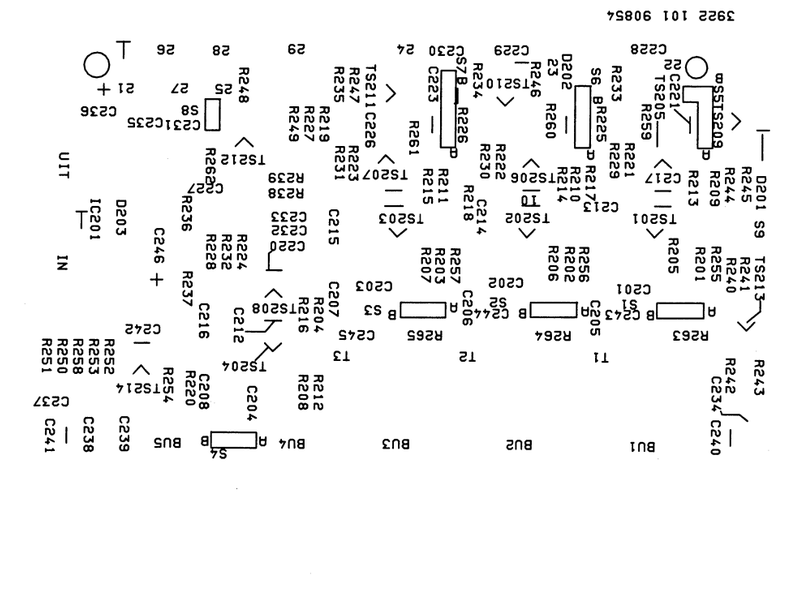
7. PARTS LIST

Pos. nr.	Description	Ordering code
9	Mains switch	5322 277 14094
27	56201D mica	5322 310 40102
D6	CQX54 LED	4822 130 32262
D7	CQX74 LED	4822 130 32342
D15/19	BY261-200	5322 130 32687
13	Knob (60 W, 120 W)	5322 414 20106
D20-22	BYW56	5322 130 34973
F3	Fuse 1.6 A (30 W, 60 W)	4822 253 30024
F3	Fuse 2.5 A (120 W)	4822 253 30026
T1	Mains transformer (30 W, 60 W)	5322 146 30523
T1	Mains transformer (120 W)	5322 146 10118
T2	Output transformer (30 W, 60 W)	5322 140 60273
T2	Output transformer (120 W)	5322 140 60277
TS14	BD203	5322 130 44325
TS19	BDX67 (30 W, 60 W)	5322 130 44455
TS20	BDX66B (30 W, 60 W)	5322 130 42514
TS21	BDX68B (120 W)	5322 130 42694
TS22	BDX69B (120 W)	5322 130 42695
R114	Bal. potmeter (60 W, 120 W)	5322 101 24183
R115	10 Ohm, 3.5 W (60 W, 120 W)	4822 112 21054
	PC BOARD ASSY	
7	Fuse 2.5 A delayed (30 W)	4822 253 30026
7	Fuse 4 A delayed (60 W)	4822 253 30028
7	Fuse 6.3 A delayed (120 W)	4822 253 20028
C25/30	220 NF 10% 63 V	4822 121 41673
C26-29	47 NF 10% 160 V	4822 121 41676
C31	10 UF 50% 40 V	4822 124 20708
C32	2.2 UF 50% 63 V	4822 124 20724
C33	1 NF 10% 100 V	4822 122 30027
C34	47 UF 50% 10 V	4822 124 20678
C36/37	220 UF 50% 25 V	4822 124 20704
C38/39	33 UF 40% 10 V	4822 124 20945
C41	10 UF 20% 16 V	5322 124 14066
C46/47	3300 UF 30% 63 V	5322 124 40805
C48/49	470 UF 50% 10 V	4822 124 20684
C51	22 UF 50% 40 V (30 W, 60 W)	4822 124 20711
C51	22 UF 50% 40 V (120 W)	4822 124 20731
C58	6.8 UF 20% 25 V	5322 124 14081
D1/2	BZX79-B24	4822 130 34398
D3-5/13/14	BAW62	4822 130 30613
D8	BZX79-B30	4822 130 34328
D9,10	BZX79-B8V2	4822 130 34382
D11	BZX79-B6V8	4822 130 34278
D12	BZX75-C1V4	4822 130 34047
D16/17	BZX79-B56	4822 130 34258
IC2/3	NE5532FE	5322 209 86234
IC4	MC1558N	5322 209 85766
R33-36	47 K LOG	5322 101 30534
R37	47 K LIN	5322 101 20809
R58	10 K LIN	5322 101 20808

Pos. nr.	Description	Ordering code
R60	100 E 10% 0.5 W	5322 101 10577
R61	681 E 0.5% 0.4 W	4822 116 51233
R62	16K2 0.5% 0.4 W (30 W)	5322 116 55361
R62	10K5 0.5% 0.4 W (60 W)	5322 116 50731
R62	12K1 0.5% 0.4 W (120 W)	5322 116 50572
R63	1K78 1% 0.4 W	5322 116 50515
R64	10 K 0.5% 0.4 W	4822 116 51253
R77	1K0 10% 0.5 W	5322 101 10578
R88/89	E47 10% 2 W	5322 113 60022
R90	220 E 5% 4 W	4822 112 21089
R91	10 E 5% 4 W	4822 112 21054
R99/100	911 E 5% 4 W	5322 113 41145
TS11-13	BC547C	4822 130 44503
TS15	BDT95A	4822 130 42105
TS16	BDT96	5322 130 42209
TS17	BC337-40	4822 130 41344
TS18	BC327	4822 130 40854
	PREAMPLIFIERS PRINT ASSY	
5	Socket	4822 267 40209
C201-204, 213-215	10 UF 50% 40 V	4822 124 20708
C205-208	220 UF 50% 10 V	4822 124 20681
C216	220 UF 50% 10 V	4822 124 20681
C224-226	1 UF 50% 63 V	4822 124 20722
D201,202	BZX79-B6V2	4822 130 34167
D203	BZX79-B13	4822 130 34195
IC201	UA7824UC (30 W, 120 W)	5322 209 86026
IC201	AUA7805UC (60 W)	5322 209 84841
T1,2,3	Input transformer	5322 148 80187
TS201-204, 209-214	BC550B	5322 130 44454
TS205-208	BC557C	4822 130 42231
	TRANSIENTS SUPPRESSION BOARD	
C401	22 UF 50% 63 V	4822 124 20731
C402	47 UF 50% 40 V	4822 124 20713
C403	1 UF 10% 63 V	4822 121 41719
D401	BAW62	4822 130 30613
RE401	Relay	5322 280 24071
TS401	BC337	4822 130 40855


BU5
BU4
BU3
BU2
BU1
T3
T2
T1
C264
D203
D201
C236
C241
C237
C238
C239
C242
R251
R250
R258
R253
R252
TS 214
R254
R220
C208
C216
C204
C212
C220
C232
C233
R238
R239
R228
R232
R224
R262
S8
R248
C227
TS 212
TS 204
TS 208
R208
R212
R216
R204
C245
C235
C231
R236
R237
R249
R227
R219
R235
R231
R223
R247
C207
C215
C203
TS 203
C211
C219
TS 207
C226
TS 211
R261
C230
C223
R265
S3
R207
R203
R257
R215
R211
S7
R226
R218
R234
C206
C214
C202
TS 202
C210
C218
TS 206
C225
TS 210
C229
R264
S2
R206
R202
R256
R230
R222
R246
R260
C222
D202
S6
R217
R225
R233
C205
C213
C201
TS 201
C209
C217
TS 205
C224
C228
R263
S1
R205
R201
R255
R229
R221
R259
R213
C221
S5
R209
R244
R245
S9
R240
R241
TS 213
C234
C240
R242
R243
TS 209
21
26
27
28
25
29
24
23
22


3922 101 90854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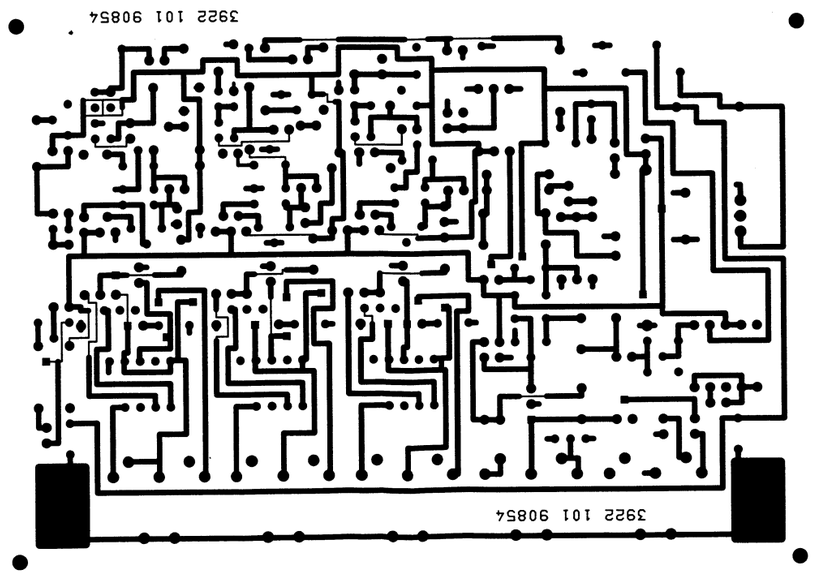
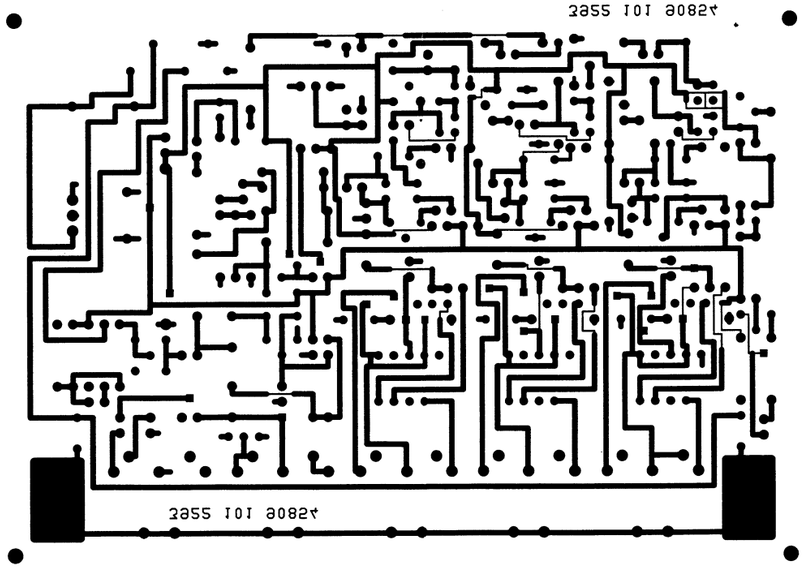

3922 101 90854
3922 101 90854


3922 101 90854
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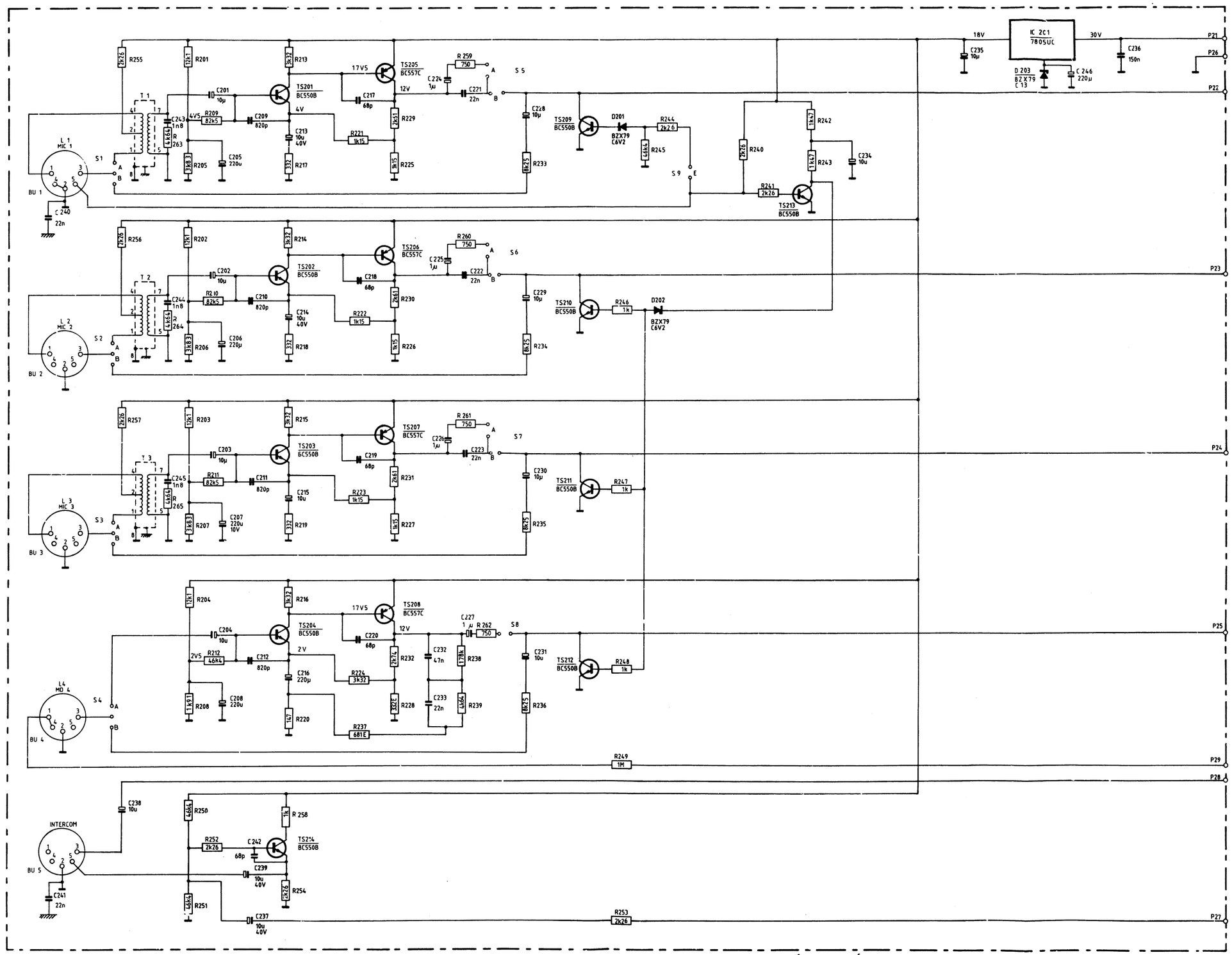


LBB 1221/40
LBB 1222/40
LBB 1223/40

TRANSIENTS SUPPRESSION UNIT SQ.22

3922 106 03260

MEASURED WITH SCOOP

MEASURED WITH DC M.VOLTMETER

IC NO	TYPE	-8V2	⏚	+8V2
2,3	NE5532N	4		8
4	MC1558N	4		8

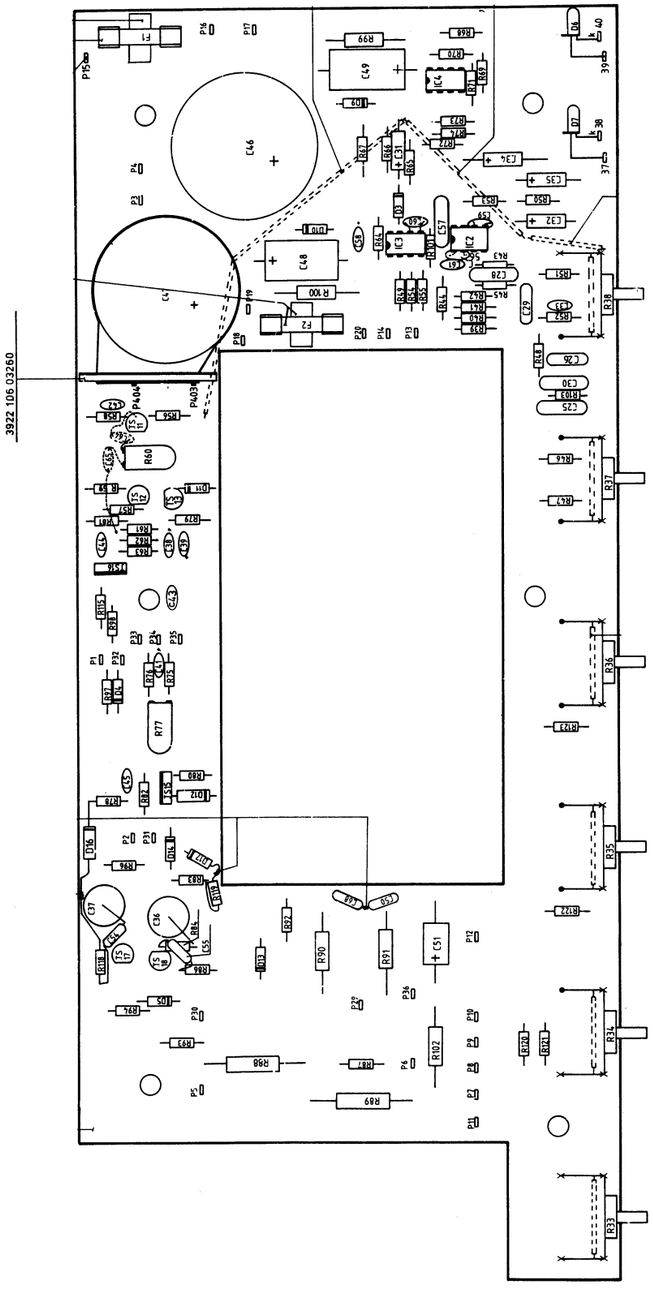
VALUES MEASURED WITH DC VOLTMETER 20KOhm/v

TOP VIEW

NE 5532N
MC 1558N

BY261-200

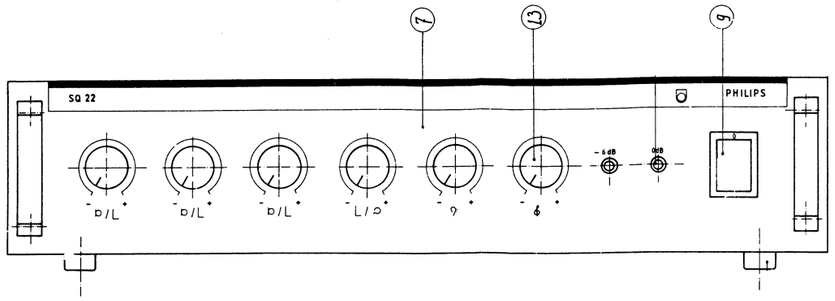
LBB 1221/40-30W

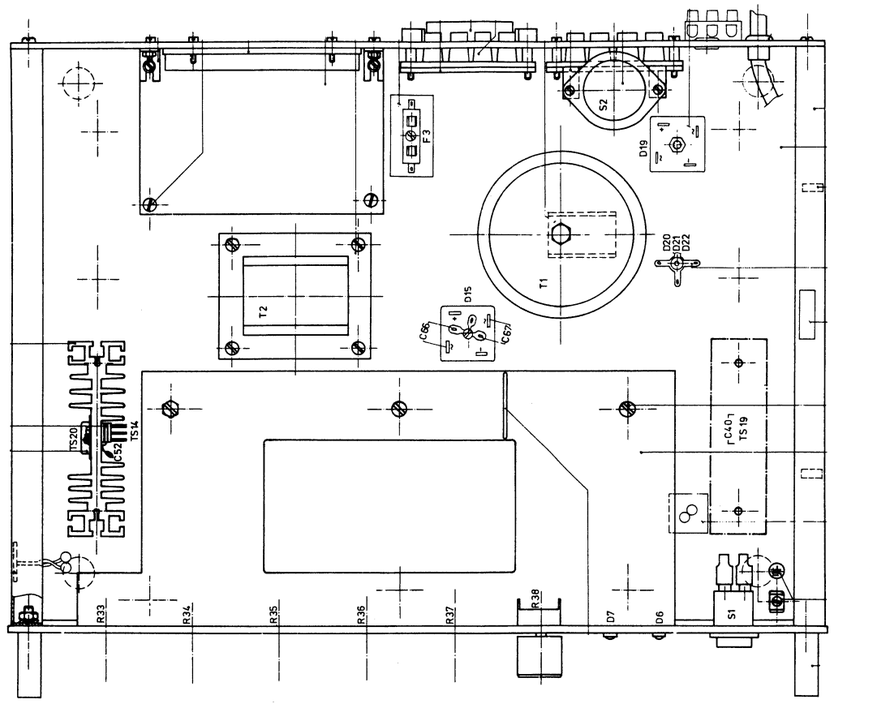


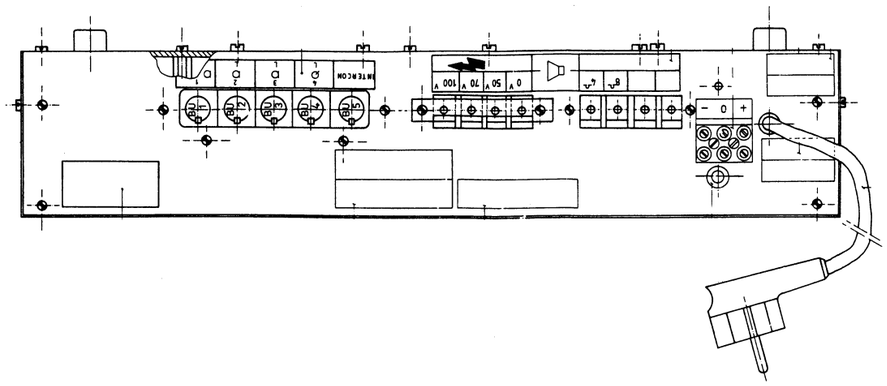
3922 106 03260

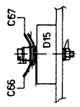
3922 101 90870

LBB 1221/40-30W









LBB 1221/40-30W

TRANSIENTS SUPPRESSION UNIT SQ.22

3922 106 03260

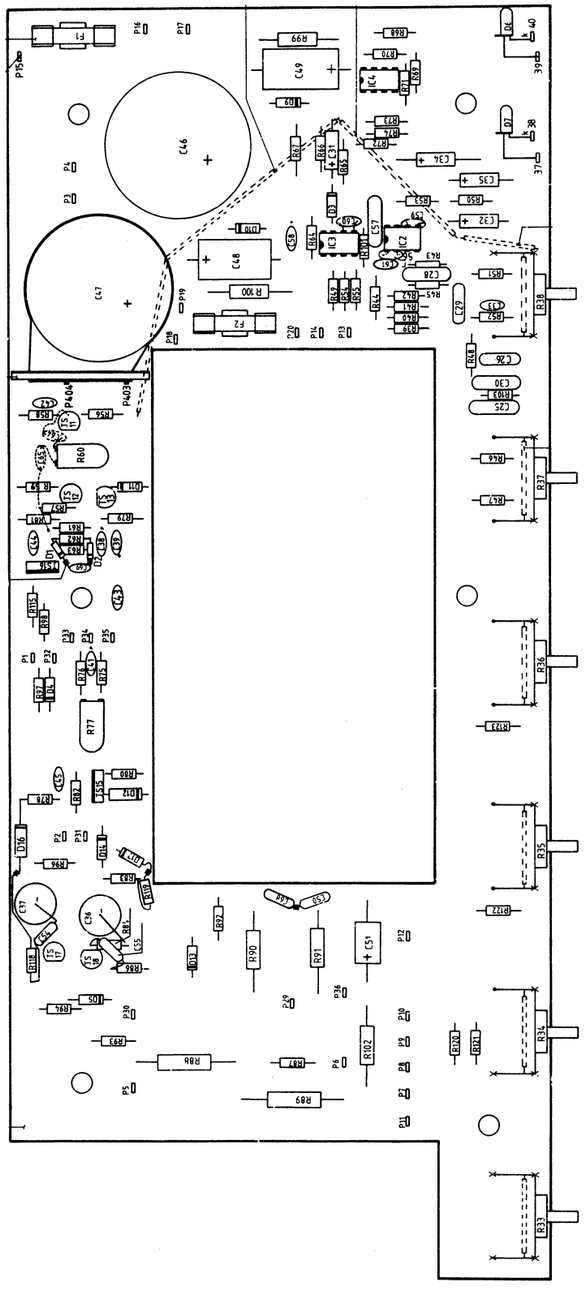
IC NO	TYPE	-8V2	⊥	+8V2
2,3	NE5532N	4		8
4	MC1558N	4		8

TOP VIEW

NE5532N
MC1558N

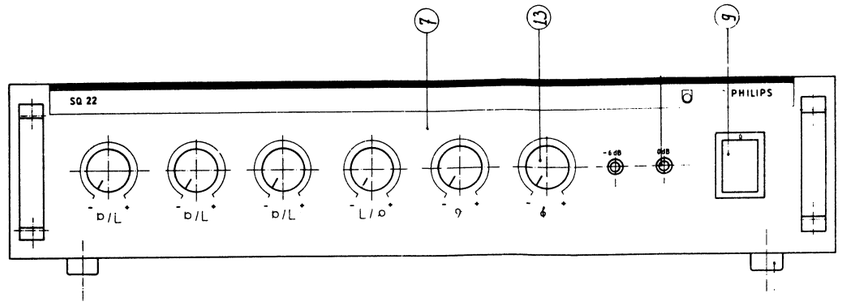
BY261-200

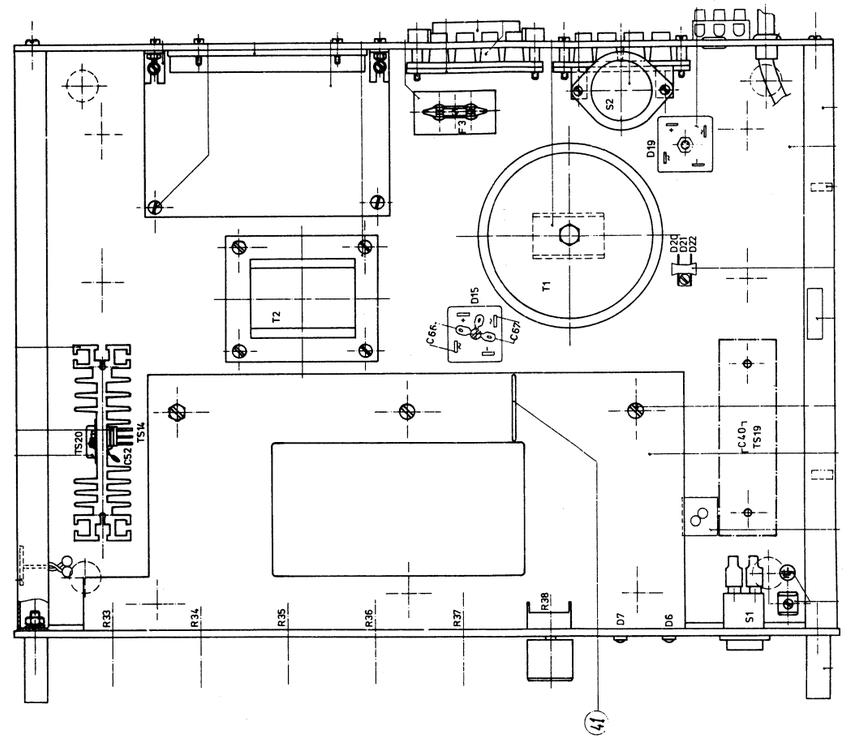
LBB 1222/40 - 60 W

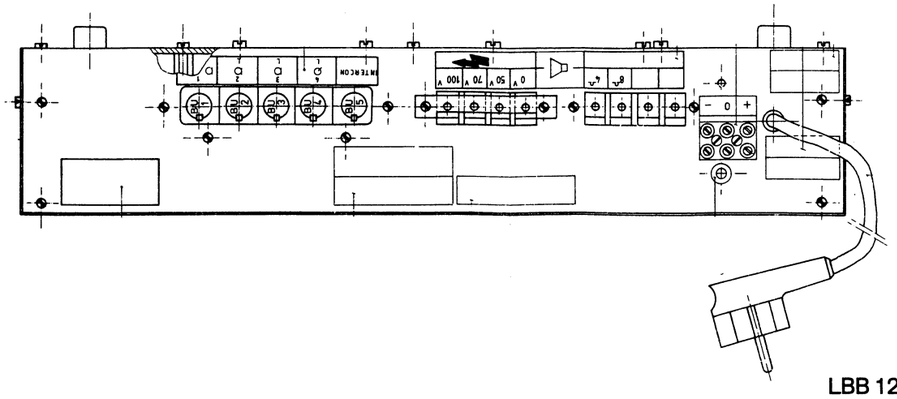


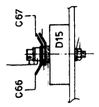
3922 101 90870

LBB 1222/40 - 60 W









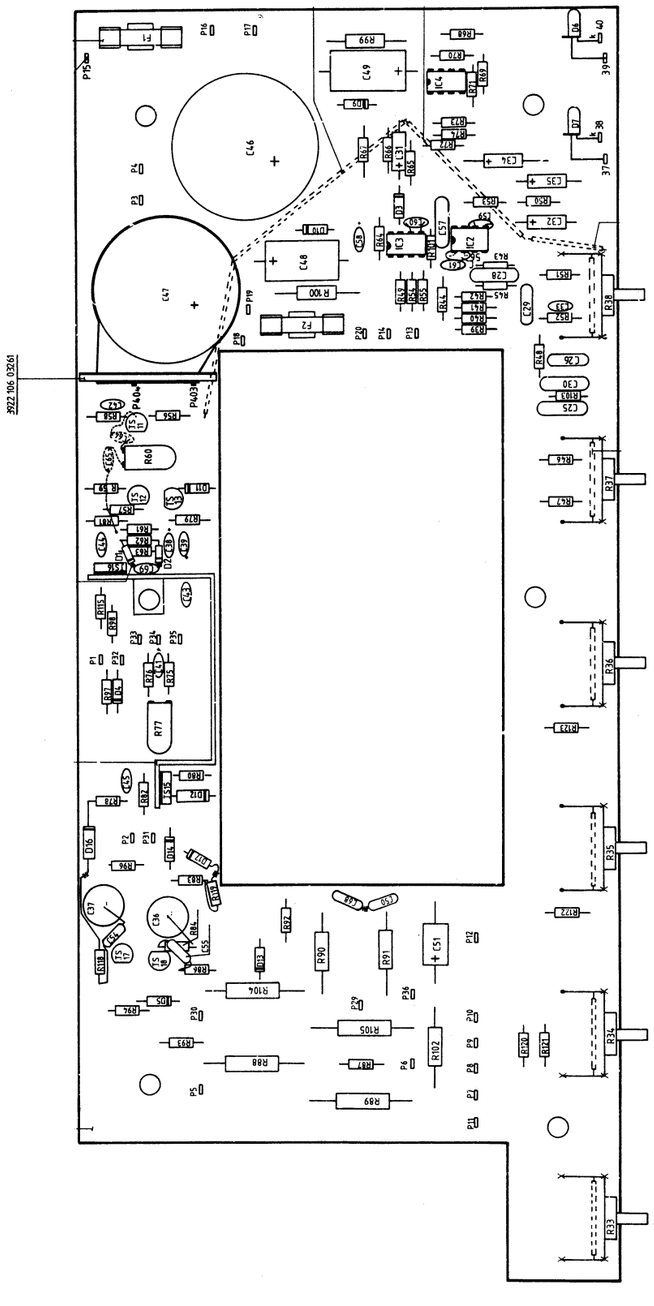
LBB 1222/40 - 60 W

TRANSIENTS SUPPRESSION UNIT SQ22

3922 106 03260

IC NO	TYPE	-8V2	⏚	+8V2
2,3	NE5532N	4		8
4	MC1558N	4		8

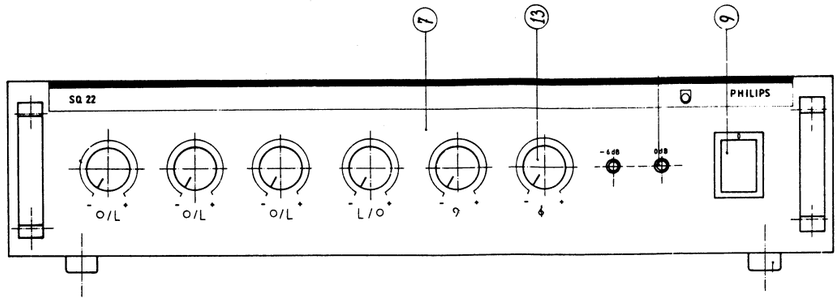
LBB 1223/40 - 120 W

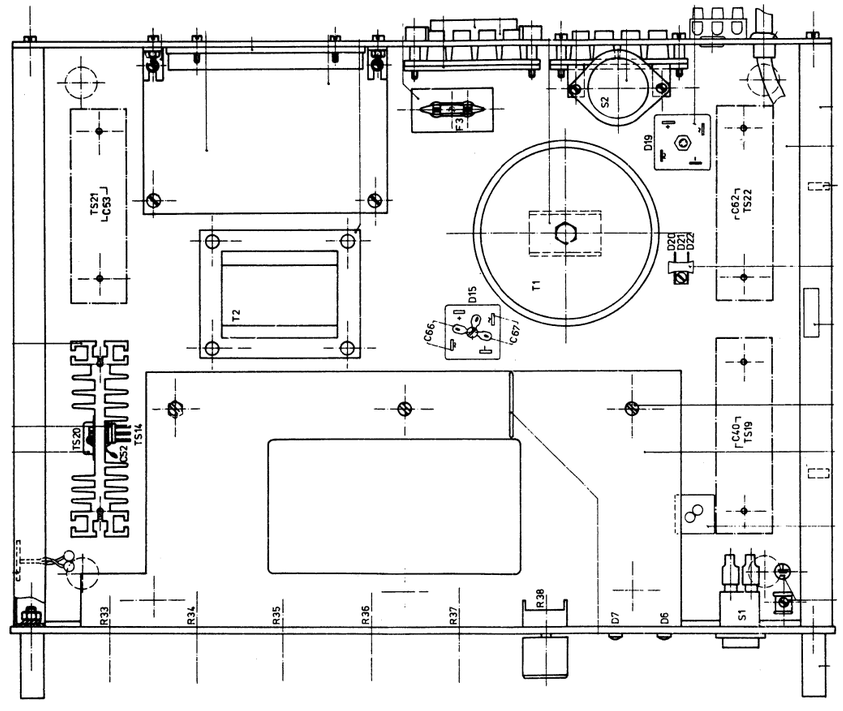


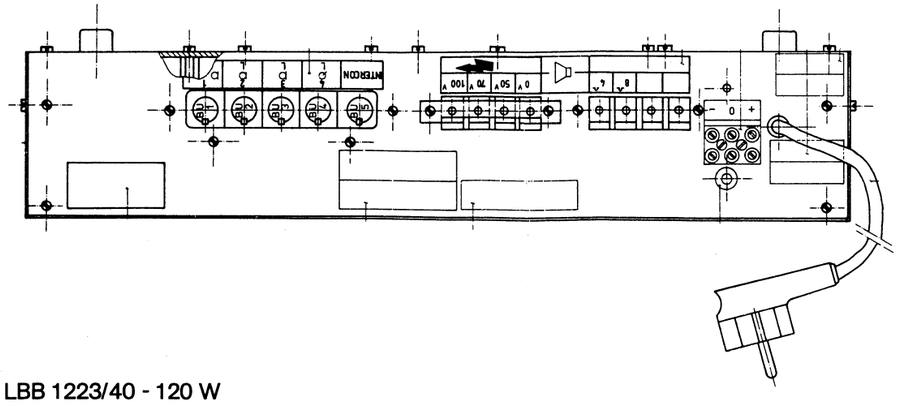
3922 105 03261

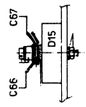
3922 101 90870

LBB 1223/40 - 120 W









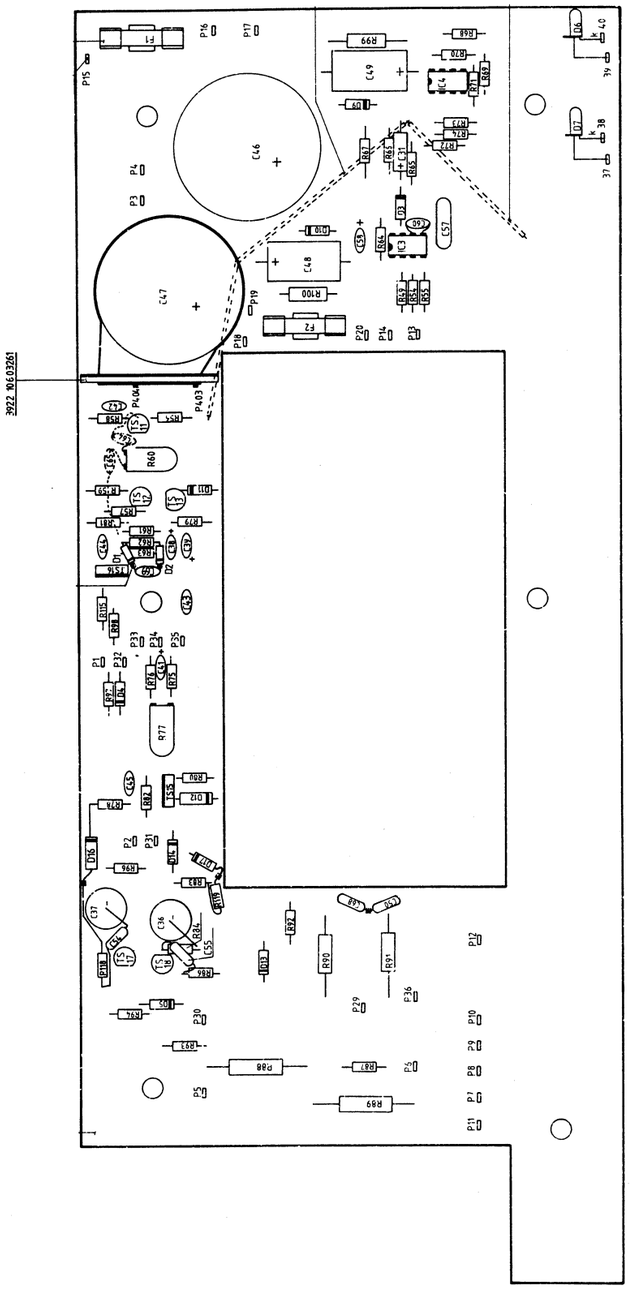
LBB 1223/40 - 120 W

DIN 180°
INTERCOM BU1
DIN 180°
INTERCOM BU2
TRANSIENTS SUPPRESSION UNIT SQ.22
3922 106 03260
IC3a NE5532N
IC4a MC1558N
IC4b
IC3b
TS16 BDT96
TS19 BDX67B
TS20 BDX66B
TS11 BC547C
TS12 BC547C
TS14 BD203
TS15 BDT95
TS17 BC337
TS18 BC327
TS401 BC337
D1 BZX79/C2
D2 BZX79/C24
D3 BAW62
D4 BAW62
D5 BAW62
D6 CQX54
D7 CQX74
D9 BZX79/C8V2
D10 BZX79/C8V2
D11 BZX79/C6V8
D12 BZX75/C1V4
D13 BAW62
D14 BAW62
D15 BY261-200
D16 BZX79/C56
D17 BZX79/C56
D19 BY261-200
D20 BYW56
D21 BYW56
D22 BYW56
RE401
T1
T2
S1
S2
F1 4AT
F2 4AT
F3 1,6AT
+43
+8V2
-8V2
-43
0
+8V2 RED
+8V2 YELLOW

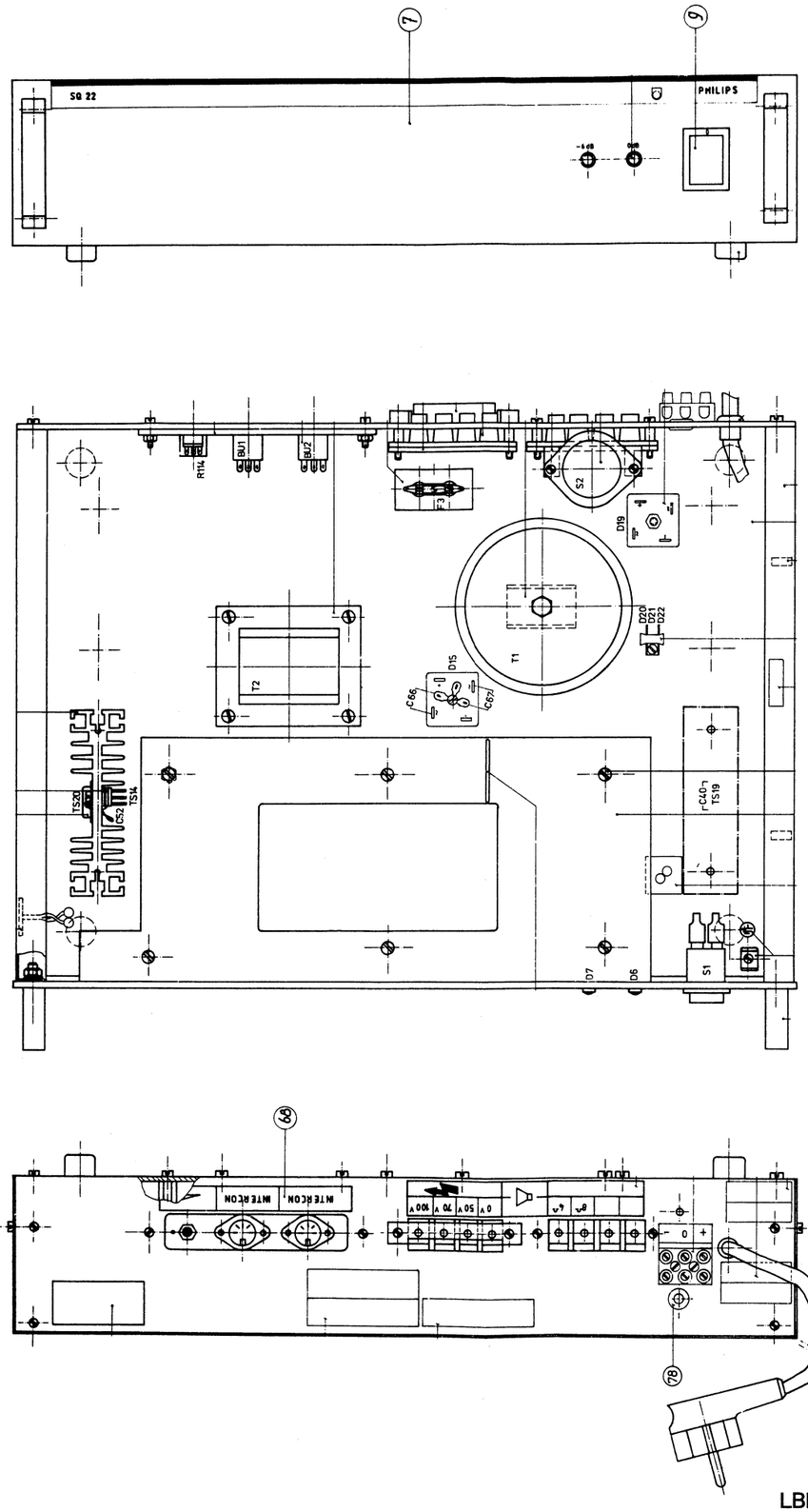
IC NO	TYPE	-8V2	⊥	+8V2
3	NE5532N	4		8
4	MC1558N	4		8

CQX54 CQX74
BYW56
BZX75
BAW62
BZX79
BC547C BC337
BC327
BD795 BD203
BD796
BDX66B
BDX67B
TOP VIEW
NE 5532N MC 1558N
BY261-200

LBB 1224/00 - 60 W



LBB 1224/00 - 60 W



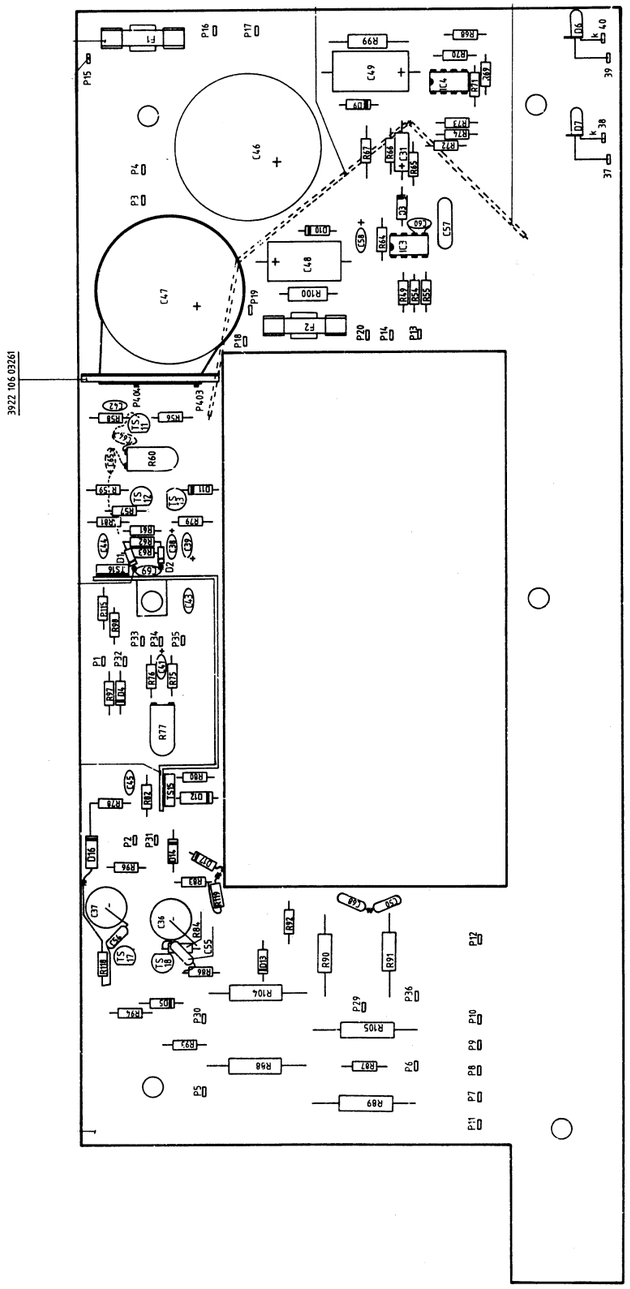
LBB 1224/00 - 60 W

DIN 180°
INTERCOM BU1
DIN 180°
INTERCOM BU2
TRANSIENTS SUPPRESSION UNIT SQ.22
3922 106 03260
IC3a NE5532N
IC3b
IC4a MC1558N
IC4b
TS11 BC547C
TS12 BC547C
TS13 BC547C
TS401 BC337
TS14 BD203
TS15 BDT95
TS16 BDT96
TS17 BC337
TS18 BC327
TS19 BDX 69B
TS20 BDX 68B
TS21 BDX68B
TS22 BDX69B
D1 BZX79/C24
D2 BZX79/C24
D3 BAW62
D4 BAW62
D5 BAW62
D6 CQX54
D7 CQX74
D10 BZX79/C8V2
D11 BZX79/C6V8
D12 BZX75/C1V4
D13 BAW62
D14 BAW62
D15 BY261-200
D16 BZX79/C56
D17 BZX79/C56
D19 BY261-200
D20 BYW56
D21 BYW56
D22 BYW56
D401 BAW62
T1
T2
S1
S2
F1 6,3AT
F2 6,3AT
F3 2,5AT
+43V
+8V2
-8V2
-43V
0V
GREY
WHITE
ORANGE
BLUE
BROWN
GREEN
YELLOW
GREEN/YELLOW
RED
BLACK
17V
110V
50V
70V
100V

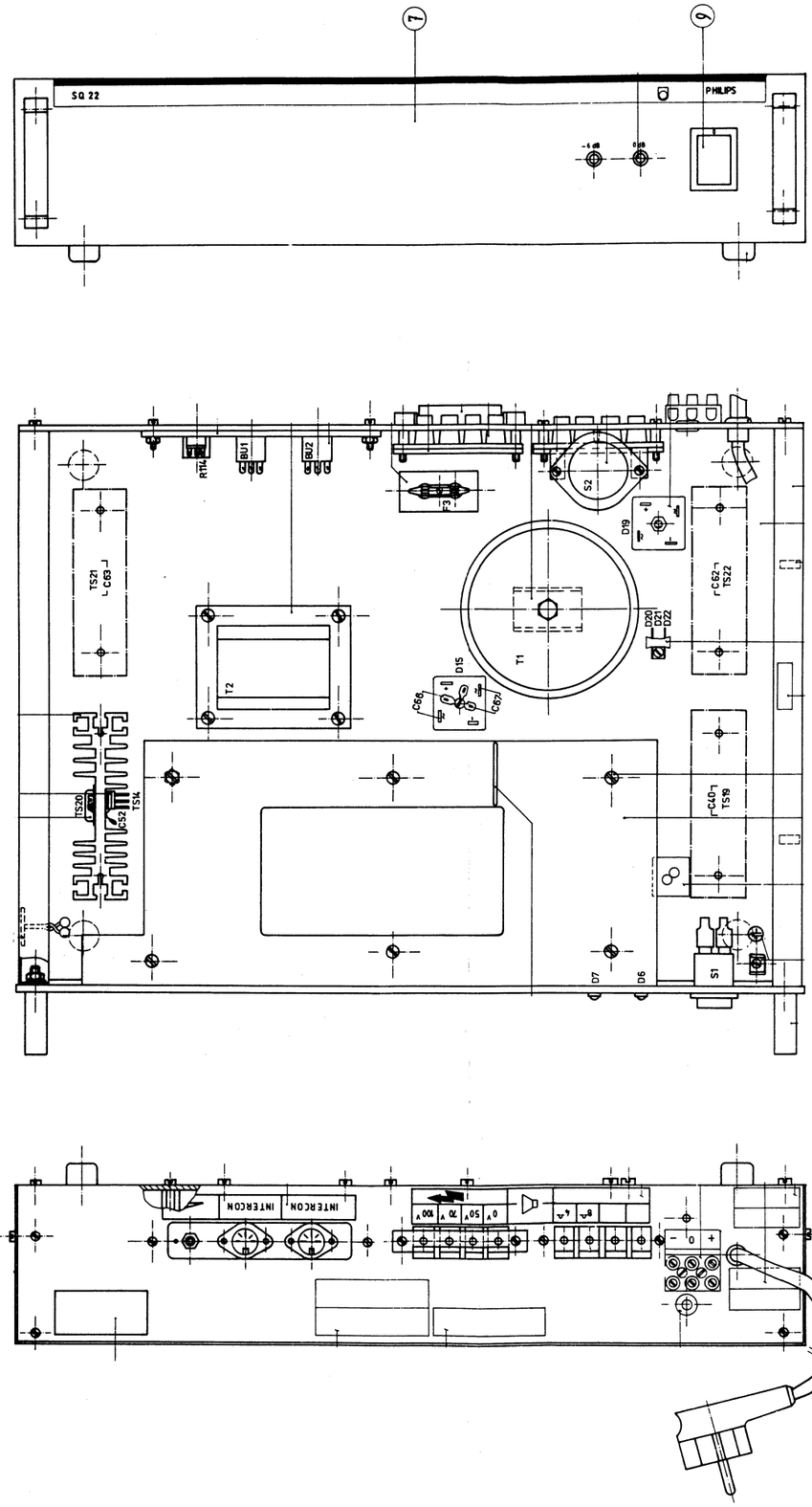
IC NO	TYPE	-8V2	⊥	+8V2
3	NE5532N	4		8
4	MC1558N	4		8

CQX54 CQX74
BYW56
BZX75
BAW62
BZX79
BC547C BC337
BC327
BDT95 BD203
BDT96
BDX68B
BDX69B
TOP VIEW
NE 5532N MC 1558N
BY261-200

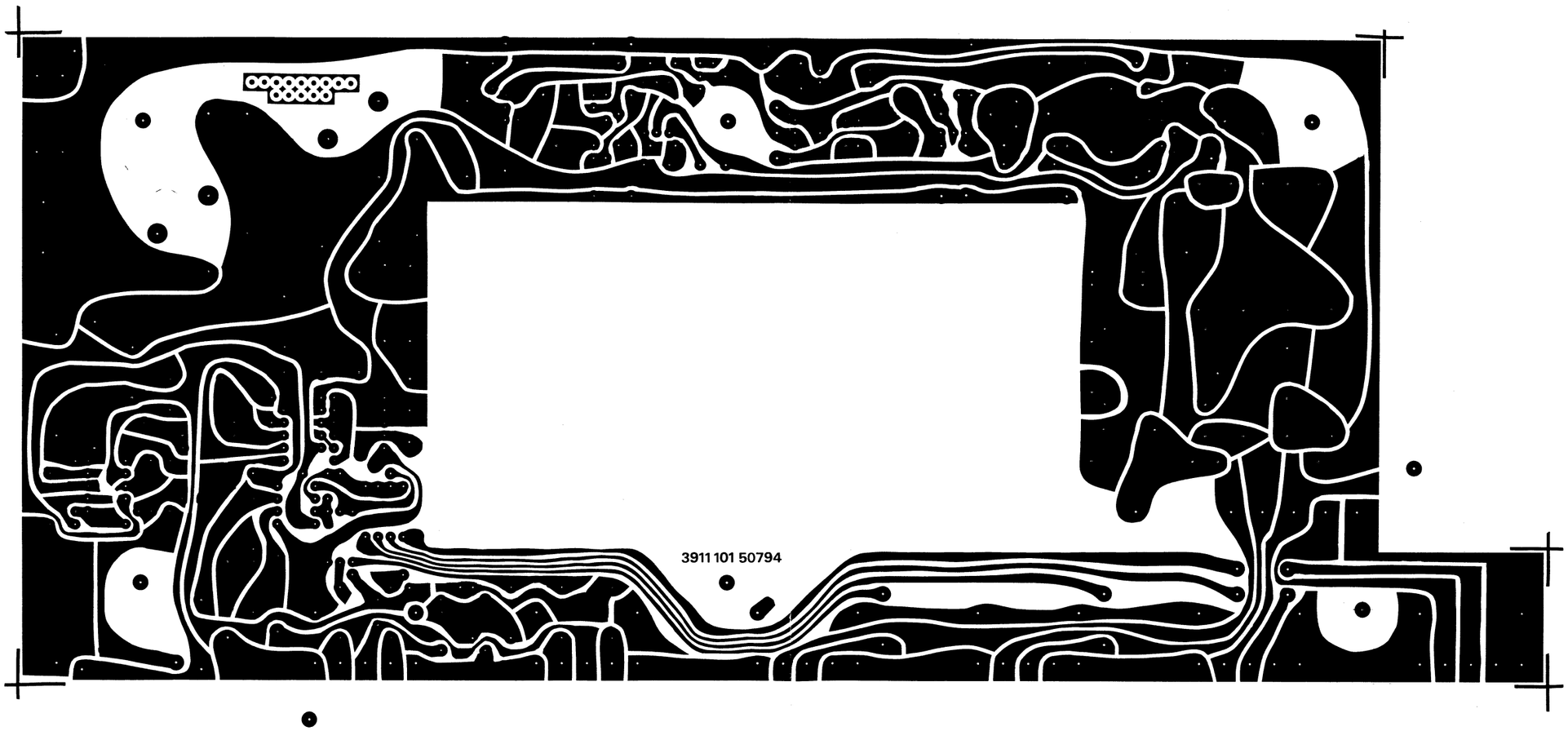
LBB 1225/00 - 120 W

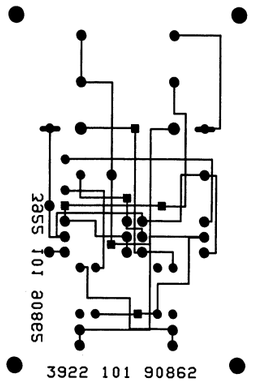


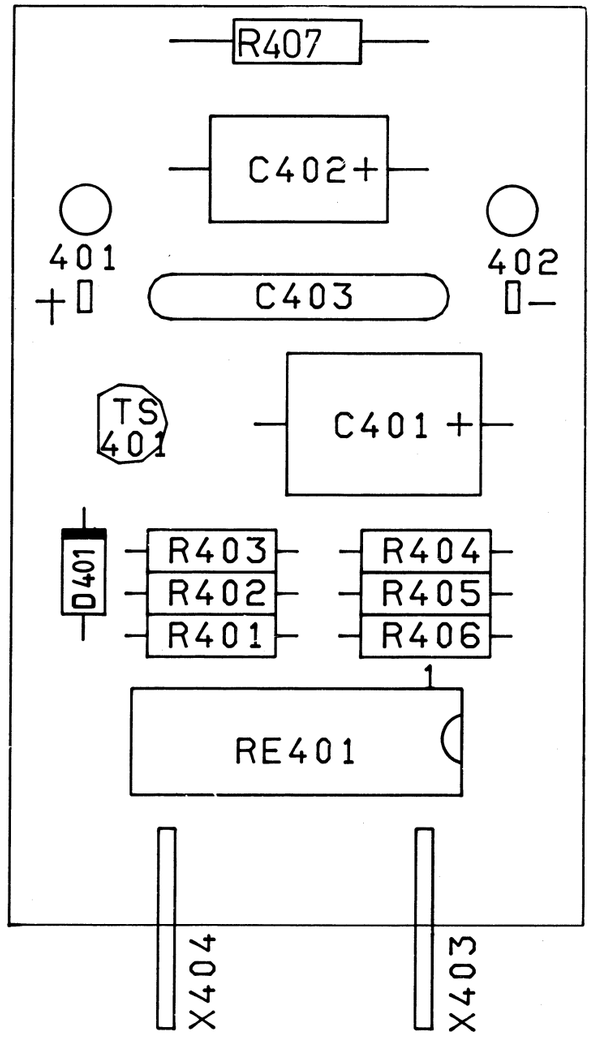
LBB 1225/00 - 120 W



LBB 1225/00 - 120 W


3911101 50794





SUPPR. UNIT

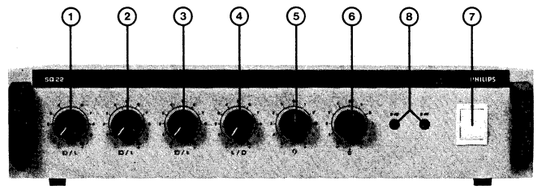


FIG. 4

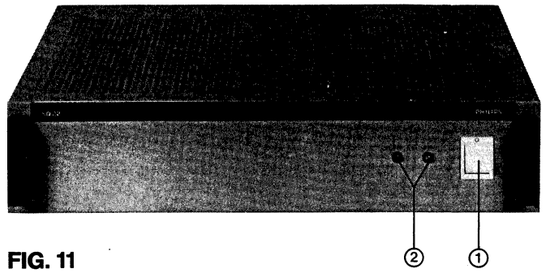


FIG. 11

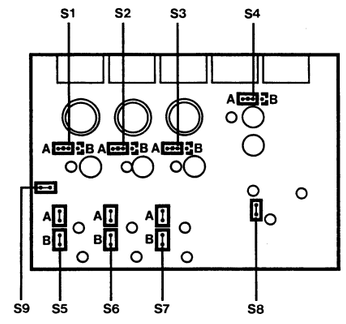
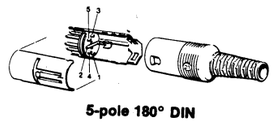


FIG. 5



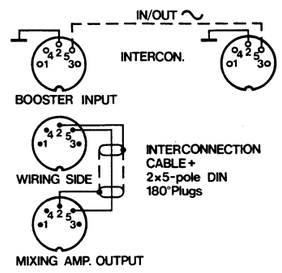


FIG. 8

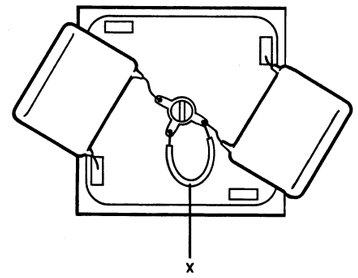


FIG. 9

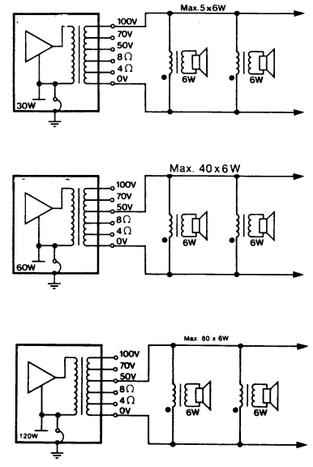


FIG. 7

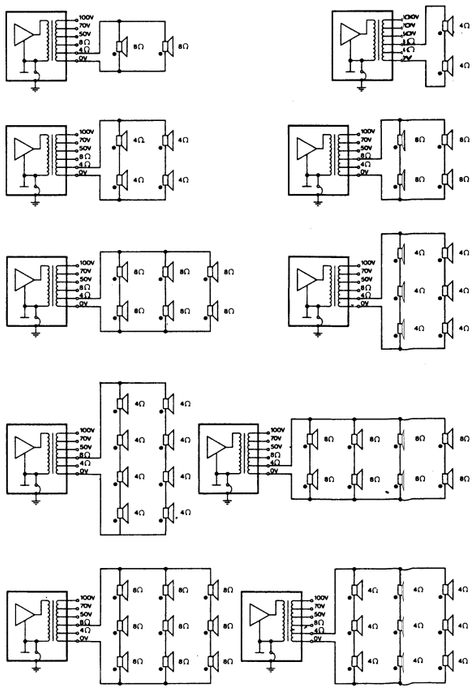


FIG. 6